An Integrated Computerized Operating Room System Combining Clinical Information, Patient Flow, and Resource Management

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INTRODUCTION

A healthcare institution's operating room is a key environment which can contribute to an organization's success or failure due to the intensity and magnitude of resources that are necessary. It is an environment which has already been subject to dramatic change as outpatient surgery and day of surgery admissions for all types of surgery have become the norm. Further change has been necessitated by the extreme economic pressures that healthcare institutions are experiencing during the transition to both managed and capitated care mechanisms for financial reimbursement. To be successful, the operating room must function at lower costs and at dramatically improved efficiencies while providing care that meets or exceeds best practice benchmark standards. These goals can be even more elusive in a traditional teaching hospital.

These changes can be disruptive and threatening to all clinicians whose prerogatives and preferences are being constantly challenged. In this turbulent environment, an integrated computerized management system can reduce workload, streamline process, and provide data that can allow clinicians to examine the variability in their practice; focus on outcome; and reduce costs. In 1988, at the onset of this ongoing project, no commercially available systems were available that met our needs.

THE APPLICATION

In this presentation, we will describe our system which evolved incrementally in response to the prioritized needs that we identified. It currently includes surgical scheduling, coordination of operation room supplies and equipment, day of surgery patient tracking by milestones, clinician notification of patient status by automated paging, linkage to ancillary areas (blood bank, pathology), and longitudinal tracking of implant/explant devices satisfying FDA requirements.

Scheduling is the first piece of the system. After a surgeon sees a patient, the clinic secretary "books" the case directly into the system utilizing the block time available to the surgeon. Time is allocated according to the surgeon's prior experience with similar procedures, need for banked blood is determined by cross-linking with the institutional surgical blood ordering schedule, pre-operative anesthesiology consultation, and ICU reservations are coordinated. The schedule is finalized on the day prior to surgery at which times anesthesiology assignments are added to the schedule and operating room case carts are prepared based on each individual surgeon's case specific preferences. Electronic preop checks are facilitated by a link to the main institutional clinical information system. The day of surgery, tracking is initiated upon the patient's arrival to the hospital. Milestones are available widely throughout the hospital for clinicians with a need to know. The Operating Room is configured with two large terminals similar to those found in airports detailing all OR milestones by room and patient. Anesthesiology is paged automatically when the patient is ready and the surgeons are paged when the patient enters the OR. Operating room nursing documentation, including specimen handling and nursing notes, are all done electronically. A link with the pathology system allows for accession entry to be made at the point of care and facilitates specimen tracking. For implants special tracking is implemented with automatic notification to both the Departments of Risk and Materials Management with the clinical information needed to satisfy reporting requirements.

As described, the system allows for detailed analysis of operating room flow, efficiency, and because of the integration with the materials management system detailed case specific cost information (see Figure 1).

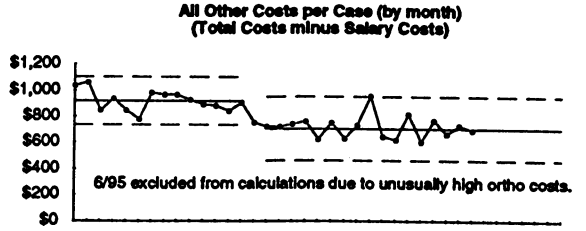

FIGURE 1

Aggregated data is made available to the clinicians with administrative responsibility for managing their portion of operating room resources. Our experience is that clinicians are active, enthusiastic participants in quality and cost-reduction efforts if they are integral to the process.

Future directions include implementation to other areas in the institution with similar needs (radiology and obstetrics) and further enhancement with post anesthesia care.

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